UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/321,518	05/27/99	GILTON T	6047-51973

MM91/0606

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EXAMINER	
LOUIE,W	

ART UNIT	PAPER NUMBER
2814	9

DATE MAILED: 06/06/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No.	Applicant(s)	
	09/321,518	GILTON ET AL.	
	Examiner	Art Unit	
	Wai-Sing Louie	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 April 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *39-56* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *39-56* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved.

12)☐ The oath or declaration is objected to by the Examiner.

Pri rity under 35 U.S.C. § 119

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)
16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
18) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
19) ☐ Notice of Informal Patent Application (PTO-152)
20) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1. Claim 47 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

   a. In claim 47, line 2, claimed matter "95% by volume" is not supported by disclosed specification.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 42 is rejected under 35 U.S.C. 102(b) as being anticipate by McConnell et al. (US 4,795,497).

With regard to claim 42, McConnell et al. disclose an apparatus (col. 5, line 20 to col. 16, line 42 and fig. 3) for delivering ozone gas to the surface of a wafer comprising:

- A wafer receiving chamber 2;
- A wafer carrier 3 position within the chamber;

- At least one wafer positioned in the wafer carrier in a substantially vertical position within the wafer receiving chamber;
- A liquid depositor 5, adapted to produce a stream of liquid solvent and form a layer of the liquid solvent on at least one major surface of a wafer supported by the wafer carrier within the chamber, where the stream is produced in a direction substantially parallel to the at least on major surface of the wafer;
- An ozone gas source 88 coupled to the chamber so as to deliver ozone gas to the chamber and increase the concentration of ozone gas within the chamber (fig. 3);
- The liquid solvent layer transporting ozone gas to the surface of the wafer to thereby expose the wafer surface to ozone (col. 9, lines 57-64 and col. 10, lines 12-17).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 39-41, 43-48, and 50-56, (in so far as they are understood) are rejected under 35 U.S.C. 103(a) as being unpatentable over McConnell et al. (US 4,795,497) in view of Moriyama (US 5,143,552).

With regard to claims 39-40, 43-44, 48, 50-52, and 55-56, Ofuku et al. disclose an apparatus for cleaning semiconductor wafers (col. 5, line 20 to col. 16, line 42 and fig. 3) comprising:

- A chamber 2 sized to receive at least one wafer to be clean;
- A solvent applicator 5 coupled to the chamber and adapted to vaporize and apply a solvent to at least one of the surfaces of the wafer positioned within the chamber so as to form a film of liquid on the at least one of the surfaces of the wafer (fig. 3);
- McConnell et al. do not disclose a temperature controller adapted to maintain the temperature of the wafer at the dew point. However, Moriyama discloses a temperature control of the wafer coating room. Moriyama teaches the change in temperature and humidity of the atmosphere within the room could change the yield and productivity of the process (col. 1, lines 63-67). Thus, it would have been obvious at the time the invention was made to have Moriyama's temperature control in McConnell's wafer receiving chamber to control the quality of the product.
- A gas source 88 coupled to mixing tank 70, where high purity water is mixed with ozone (col. 9, lines 57-64). The at least one reactive gas being selected to chemically react with the surface of the wafer to clean the wafer;
- Where the liquid solvent comprises a transport medium which carries at least some of the at least one reactive gas through the film to the at least one of the surfaces of the wafer where the at least one reactive gas chemically reacts with the

at least one of the surfaces of the wafer (col. 9, lines 44-50 and col. 10, lines 12-17).

With regard to claim 41, McConnell et al. disclose at least one reactant gas comprises ozone as a major component, and the solvent comprises water as a major component (col. 10, lines 4-14).

With regard to claims 47 and 54, McConnell et al. do not disclose the concentration of the dissolved gas in the solvent. However, one with ordinary skill in the art would know the solubility of gas in water depends on the function of temperature and pressure. The range of 10% to 95% is a huge range. It is obvious, under normal atmospheric pressure and ambient temperature, the mixture of solvent in McConnell is within this range.

With regard to claim 45, McConnell et al. disclose a reactant gas incorporator 5 adapted to introduce reactant gas into the liquid before the liquid layer is formed (fig. 3).

With regard to claim 46, McConnell et al. disclose an apparatus for stripping photo-resist from semiconductor wafers comprising:

- A film former 5 adapted to condense a solvent to form a film of liquid solvent onto a surface of the wafer which is to be stripped of photo-resist (col. 1, lines 38-44);
- A gas exposer 88 adapted to expose the film of liquid solvent to a source of at least one reactant gas which is substantially non-chemically reactive with the solvent and which is chemically reactive with the photo-resist so as to the strip the photo-resist from the wafer surface;

- A cooling mechanism operable to cool the surface of the wafer (as described in claim 43 above);
- Where reactant gas is transported through the film of liquid solvent to the wafer surface (fig. 3).

With regard to claim 53, McConnell et al. do not disclose the thickness of the film of condensed liquid solvent between 1 micron and 3000 micron. However, one with ordinary skill in the art would know the film thickness depends on the surface tension of the water. The range of 1-3000 micron is a huge range. It is obvious, under the normal conditions, the thickness of the solvent in McConnell is within this range.

4. Claim 49 is rejected under 35 U.S.C. 103(a) as being unpatentable over McConnell et al. (US 4,795,497) modified by Moriyama (US 5,143,552) as applied to claim 39 above, and further in view of Bachman et al. (US 4,946,549).

With regard to claim 49, McConnell et al. do not disclose the solvent is a perfluorocarbon. However, Bachman et al. disclose the perfluorocarbon such as CF_4 and other poly-fluorocarbon material are used to remove SiO_2, Si_3N_4, photoresist, and polyimide from silicon wafer (col. 2, line 59-67). Thus, it would have been obvious to one with ordinary skill in the art to use perfluorocarbon to remove the photoresist from wafer.

Response to Arguments

5. Applicant's arguments filed 4/25/01 have been fully considered.

a) Reference Iimuro (JP 01-239933) and Hawthorne (US 5,785,875) are no longer used in above rejections. The argument in items I, II, IV and V of the present amendment are moot.

b) Applicant argues the fluid 7 in Ofuku is not water in item III of the present amendment. However, Ofuku is no longer used in above rejections. The argument in item III of the present amendment is moot.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wai-Sing Louie whose telephone number is (703) 305-0474. The examiner can normally be reached on 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

wsl
June 2, 2001

Olik Chaudhuri
Supervisory Patent Examiner
Technology Center 2800